The agricultural land exploitable by each village was more than adequate, but it was by no means unlimited. Amazonian forest soil is generally of extremely poor quality. It is loose and friable and thus suitable to the simple digging sticks used by the shantigiras in planting, but it lacks the colloids essential to hold the minerals in the topsoil. The result is that the minerals are leached into the subsoil by the heavy annual rains. However, there is some variation in soil quality even in this fairly uniform environment. Much land is unusable in rainy season due to being periodically inundated or because it is sandy, grass covered savannah. The utilizable forest land is divided by the Yanomamö into black earth, red earth, and clay earth. The latter two are further subdivided if they contain a significant percentage of sand. Black earth is the best land and is usually the only kind in which squash, melon, beans, and rice can be raised. These crops can be grown with uncertain prospects of success in red earth while maize can be raised in both. The tuber crops grow in all kinds of soil. Since black earth is not accessible to all villages, the list of Yanomamö crops is often drastically reduced in certain locations.

The land cannot be used for more than two plantings and on the second planting, in all types of soil, only bitter manioc is raised. Certain crops, such as pineapple, replant themselves. The reason for this two planting system is the crop when one considers that bitter manioc matures in about eight months on the first planting and from fourteen to eighteen months on the second in the already "tired" soil. A third planting would yield little and, also, as the <u>caburis</u> says,

tato (*Ipomoea batatas*), maize, beans, squash, pineapple, and pepper. At some time after the advent of the whites in the Western Hemisphere such plants as bananas, rice, potato, and sugar cane were introduced. Cotton, although native to the New World, was not adopted and used by the Munduruc until the nineteenth century. Similarly, although the potato is native in western South America it was not found aboriginally in the eastern part of the continent.

The agricultural land exploitable by each village is more than adequate, but not unlimited. Amazonian forest soil is generally of extremely poor quality. It is loose and friable and thus suitable to the simple digging sticks formerly used by the aborigines in planting, but it lacks the colloids essential to hold the minerals in the topsoil. The result is that the minerals are leached into the subsoil by the heavy annual rains. There is some variation in soil quality, however, even in this rather uniform environment. Much land is unusable in Munduruc territory because it is periodically inundated or because it is sandy, grass-covered savannah. The tillable forest land is classified by the Munduruc into the categories of black, red, and clay earth. The latter two are further subdivided if they contain a significant percentage of sand. Black earth is the best land and is usually the only kind in which they raise squash, melon, beans, and rice. These crops can be grown with uncertain prospects of success in red earth while maize can be raised in both. The tuber crops grow in all kinds of soil. Since black earth is not accessible to all villages, the list of Munduruc crops is often drastically reduced in certain locations.

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12:Murphy E-5 (1952-1953) 1960
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cutting the bark and the metal cups in which he collects the rubber, he always carries his arms, hopeful for stray game. He wends his way through the forest, making an incision in the bark and setting a cup below it on the outward journey and collecting the latex on the way home. He frequently stops to collect fruit, shoot a monkey, or bathe. After returning home he cures the latex in a small shed built for that purpose. He then goes to the adjacent river and bathes; if it is not too late he may fish with a bow and arrow from the bank. On days when he does not visit his rubber avenue, the Munduruc6 hunts or fishes. He is joined by the other men of the house if there are any; otherwise his pursuit is solitary, and the favored collective-hunting techniques cannot be employed. This and the general lack of firearms, which if he had them would make him hunting more productive, result in a marked decrease in hunting during the dry season. Fish may be taken by individuals, and the kill of a few hours is generally ample for the needs of a nuclear family. On the other hand, a solitary hunter may pass two or three days without killing more than birds or a small monkey.

Large dry-season households commonly make gardens near their rubber avenues, but single family units rarely do so because they do not have enough workers to clear forest land. The advantages of rubber-avenue gardens outweigh the labor and inconvenience of clearing and planting them. The resident families have a local supply of farinha, which would otherwise have to be made in the village and transported to the rubber avenue, a difficult chore without canoes. Also, the land in the savannah country is inferior in quality to that near the larger rivers. Almost every rubber-avenue garden is in black soil, and this favored land is extremely scarce in the vicinity of Caburi. These gardens are therefore frequently drawn upon to sup-

/I cont./

this estimate. Through repeated tests he finds out the type of the soil and draws the necessary conclusions. As a rule, he proceeds as follows: with the machete, he digs a hole and examines the soil. By crumbling it between his fingers, he finds out its quality by touch. He distinguishes three types: sandy, clayey, and black, allowing for certain variants and intermediary types, according to the composition and percentage of clay or sand. He makes these soil tests at various depths and in various places when he suspects that only a thin layer is involved, or to find out how far /the layer/ extends. The type of garden also depends on the type of the soil; in other terms: depending on what he wishes to plant, he has to choose a /specific/ type of soil. For this reason, in his hunting forays through the forest, the Indian pays attention to the ground through which he passes in order to find out where he will find appropriate soil when he needs it. The following rule applies as a general norm:

sandy soil:	good only for bitter manioc; inadequate for other plants.
clayey soil:	good especially for bitter manioc, tubercles in general, and also for banana plantations; other plants do not grow well in this soil.
black soil:	good for everything. For this reason, black soil is always sought out and preferred. This is the tobacco ground par excellence.

2. Size and shape of the plot. As was already partly explained, the size of the plot depends on the quality of the soil. If /the Indian/ finds the chosen soil somewhat weak, he figures out beforehand that the harvest will be less satisfactory, and makes the plot somewhat larger. From the practice he has acquired since youth, he empirically figures out the area that will be needed. To do this he does not use measurement, as our peasants do ("braças," "varas," and such). I attempted in various ways to find out how the Munduruku figure out the size of the plot he is about to prepare. The answers were always the same: "... just by looking, you already know ..." /it/ or "... just by looking...." If the family has grown through the years,

/26 cont./

*241 602 431 are closely united, or when, owing to some reverse, one of the family members cannot prepare his own garden but can help in the preparation of that of his father, brother, son, etc. then, sometimes, a communal plot is prepared. This refers, however, to the concept of "garden" in its absolute sense: a garden of bitter manioc, of tubercles. For they always continue to plant their own bananas, pepper, etc., separately, for their own private use, each family for itself. This type of "communal garden" is found also (or exclusively?) /27/ outside the old community, among the acculturated Mundurukú. I observed such a case, between father and son, in the mission itself, where everyone has his own home. Both parties have equal right to the use of the garden. This type of "communal garden" is quite similar to that known among the peasants as a "company garden." The difference between the two types might perhaps be defined as follows: the "communal garden" serves directly for the use and sustenance of the families involved; the "company garden" exists on a contract basis, and its foundations and goals are usually commercial.

423 428 Once there is property, there arises the problem of inheritance. Each garden has its owner, with all ownership rights. In case of death, the plot passes into the hands of the eldest son, who is, however, nothing more than the "administrator" of this inheritance with a share in the usufruct. The heir is the family, represented by the eldest son in the sense that he must look after the plot, which the family shares along with him. When there is no family, the brothers inherit the plot. If there are no brothers, the other relatives do. In any case, the garden is not allowed to go to waste, and its produce is always utilized.

3. Garden and group: intraterritorial migrations

*241 361 At first sight, the Mundurukú gardens often seem to lie far from the house or village. And, in fact, this is frequently the case. But this is nearly always the result of long years of permanence in one and the same spot. As time goes by, the soil around the houses becomes weak and exhausted. (15)[34] It is for this reason that the Indian

[34] [See category 116, p. 32 for explanation of this footnote--Analyst]